



Natural Gas

The Natural Choice Now for Louisiana

Louisiana Public Service Commission
Baton Rouge, LA
April 20, 2011

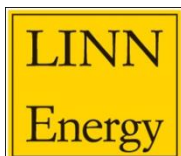
James Tramuto
Southwestern Energy Company
Vice President
Governmental & Regulatory Strategies



- **Focused on exploration and production of natural gas.**
 - *4.9 Tcfe of reserves; 12.2 R/P at year-end 2010.*
- **E&P strategy built on organic growth through the drillbit.**
 - *Over 70% of planned E&P capital allocated to drilling in 2011.*
- **Track record of adding significant reserves at low costs.**
 - *From 2005 to 2010, we've averaged over 40% annual production and reserve growth and annually replaced almost 500% of our production at a F&D cost of \$1.32 per Mcfe.*
- **Proven management team has increased Southwestern's market capitalization from \$187 million at year-end 1998 to over \$13 billion today.**
- **Strategy built on the Formula:** $\frac{R^2}{A} \rightarrow V^+$

The *Right People* doing the *Right Things*, wisely investing the cash flow from the underlying *Assets* will create *Value +*.

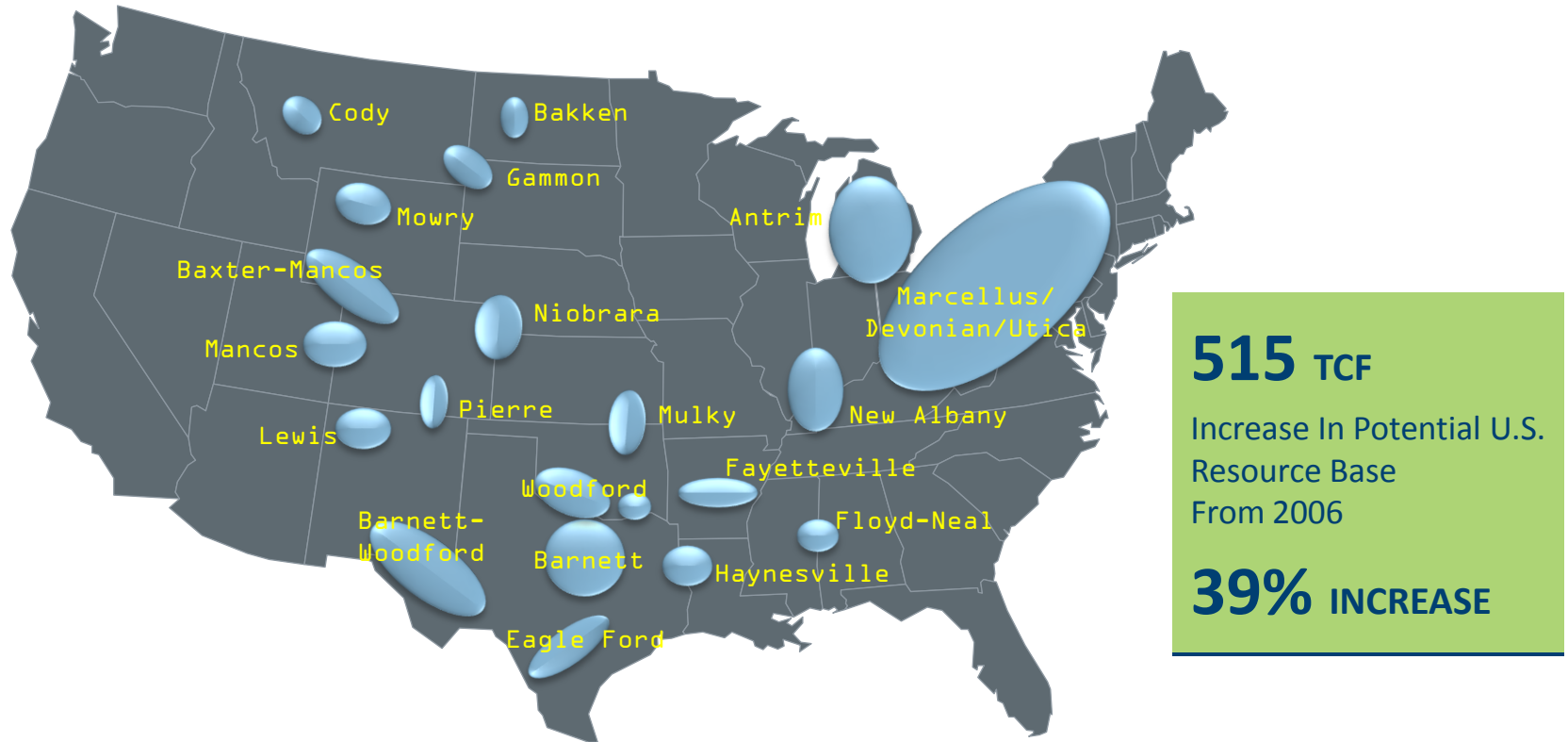
ANGA Members





ABUNDANT and AFFORDABLE

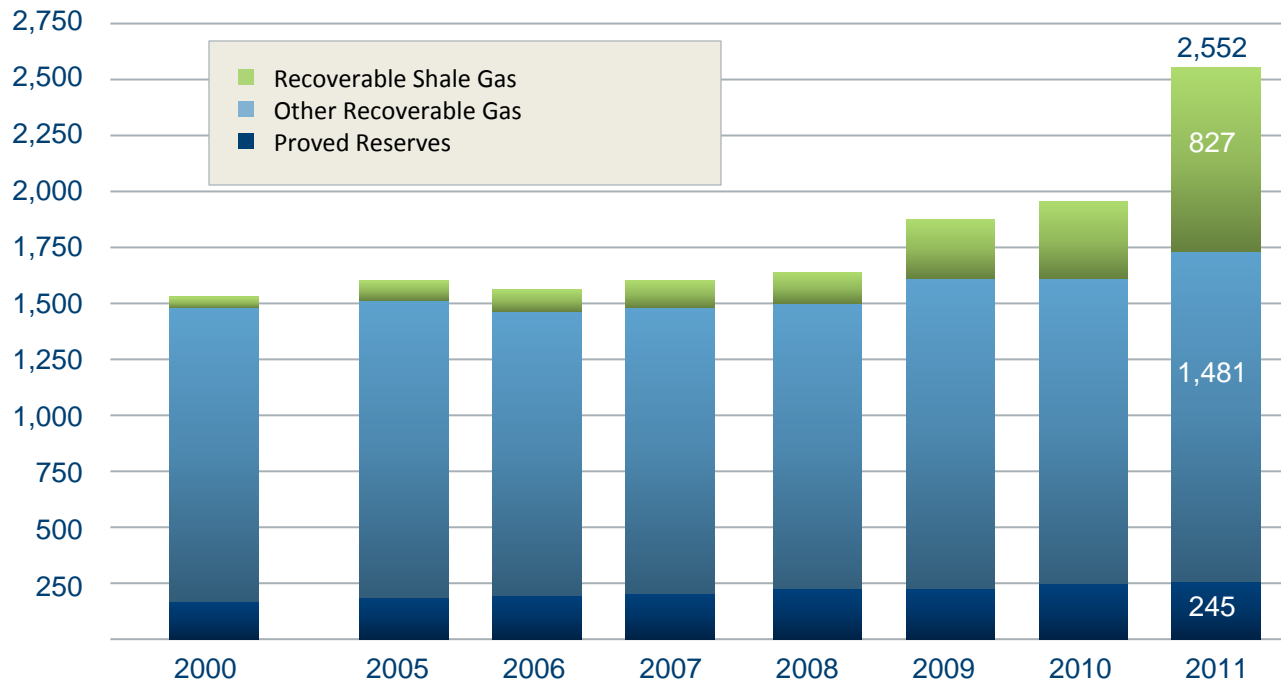
The Shale Gas Revolution



Source: NPC 2003, PGC 2009, EIA, INGAA, others

A New Age of Nat Gas Abundance

Technically Recoverable Natural Gas (trillion cubic feet)

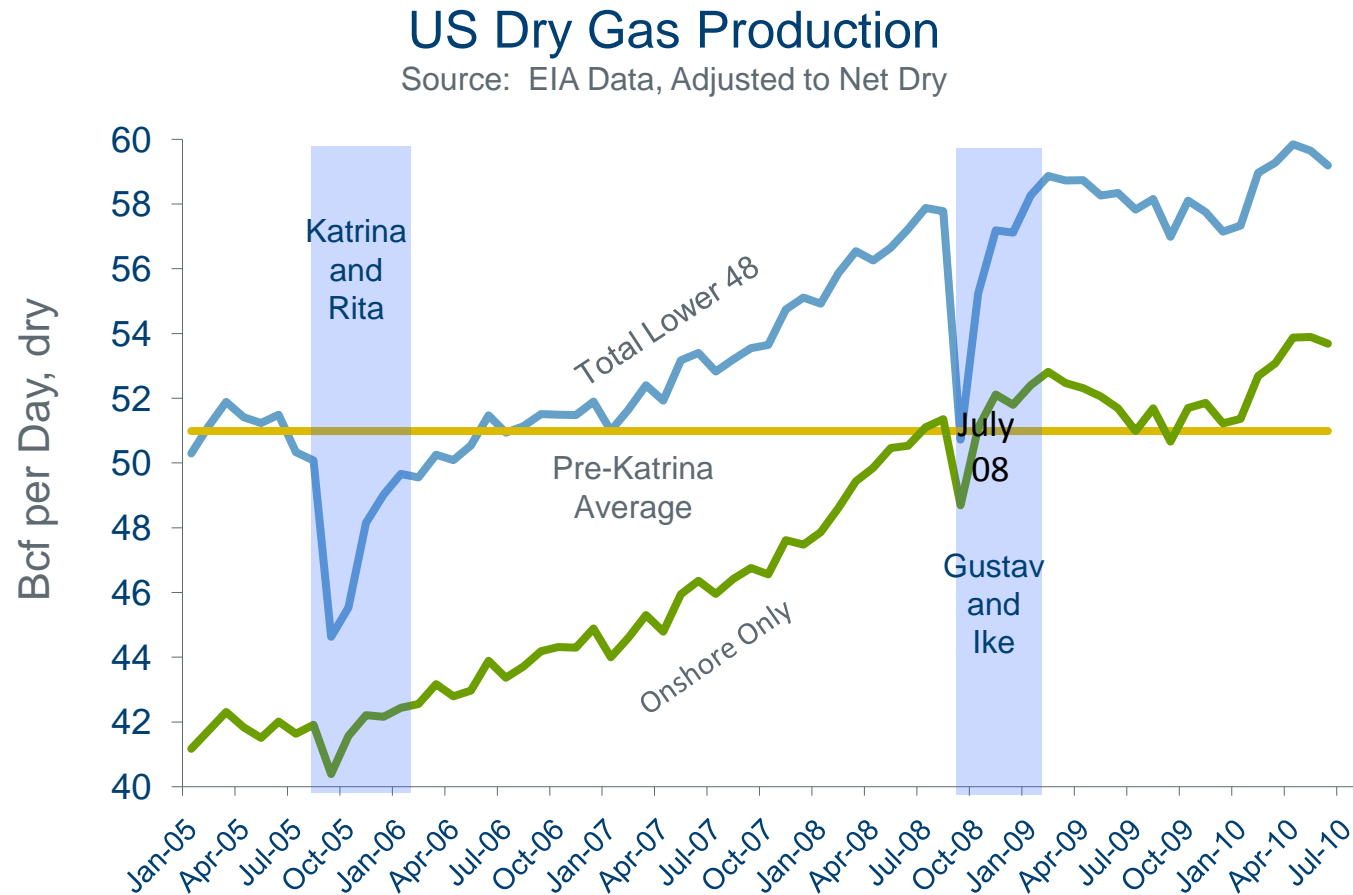


2,552 TCF
Estimated Future Supply

100+ YEARS
Supply Here in the US

Source: EIA Annual Energy Outlook 2011

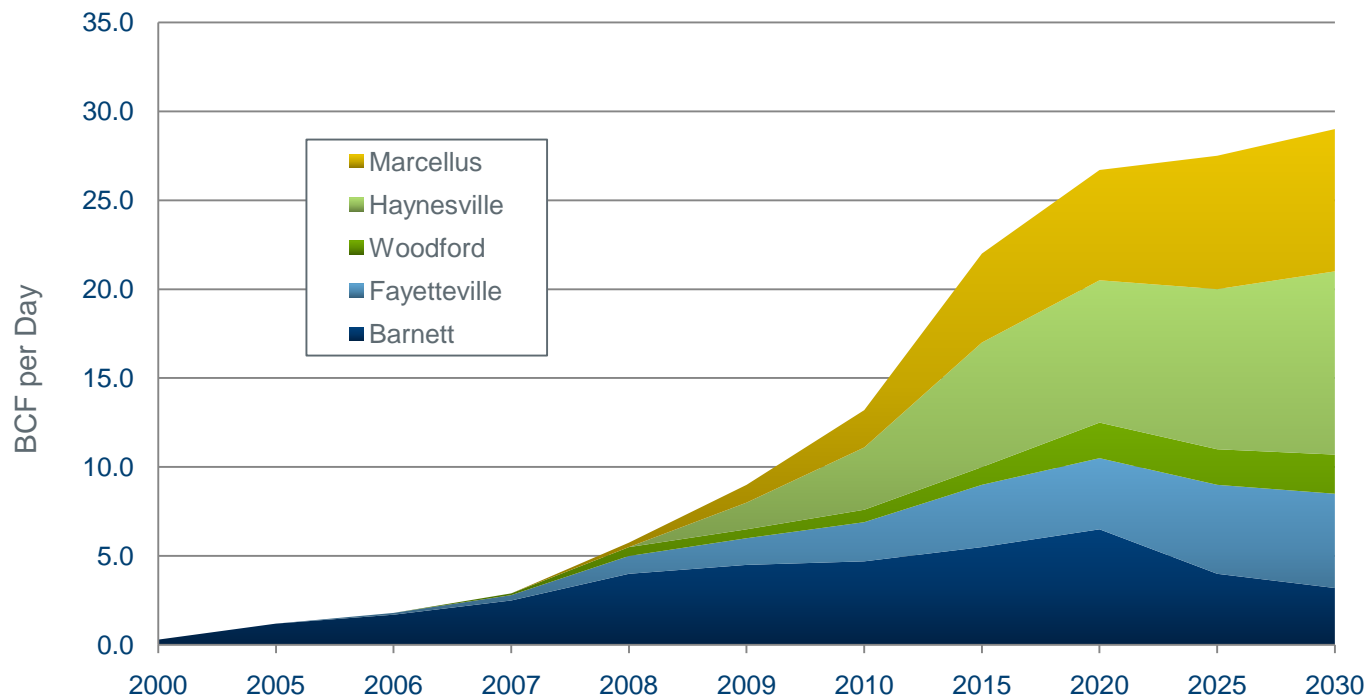
By Mid-2008, Onshore Production Had Replaced Offshore



A Recent MIT Gas Study Shows Sustained Rates of Increase

Potential Production Rates from Major Shale Plays

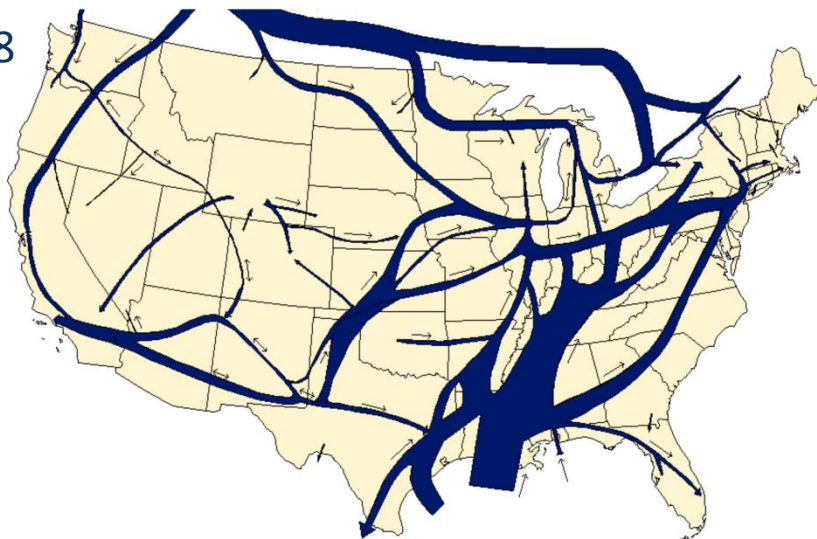
(Using January 2010 Drilling Rates and Mean Resource Estimates)



Source: MIT "The Future of Natural Gas" Interim Report, July 2010; Navigant Consulting, Inc

Pipeline Additions 1998 – 2008

1998



20,000 MILES

Of New Transmission Pipeline

97 BCFD

Capacity Added in US in the Last 10 Years

Growth Driven By The Need To:

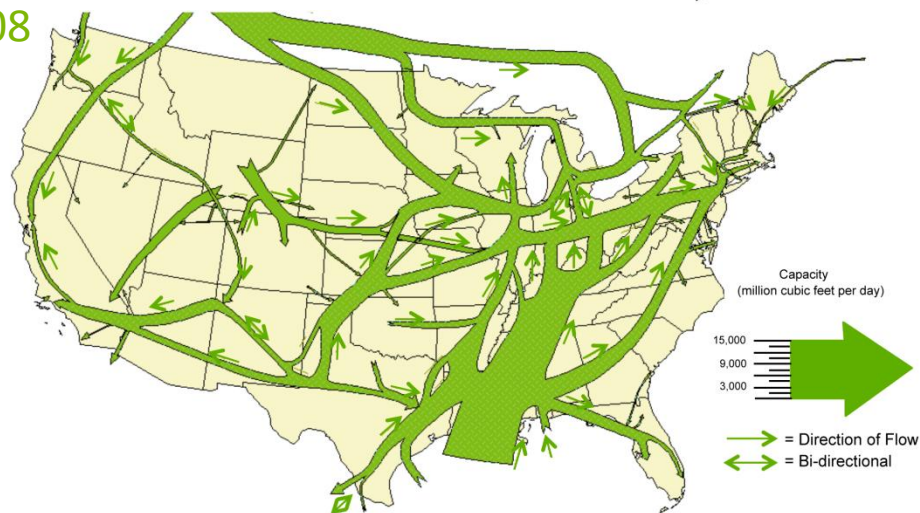
ACCESS NEW SUPPLIES

- Expanding Production From New Fields
- Imports From Canada

MEET INCREASED DEMAND

From New Gas-Fired Power Plants

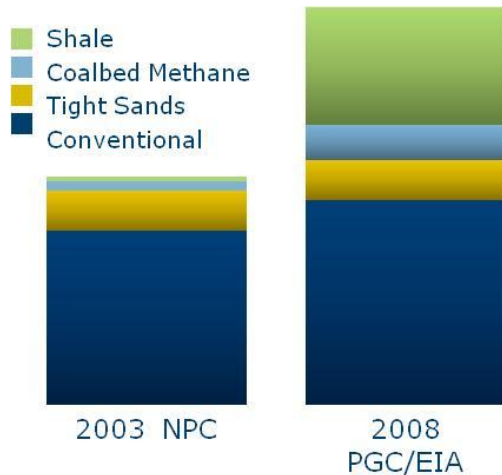
2008



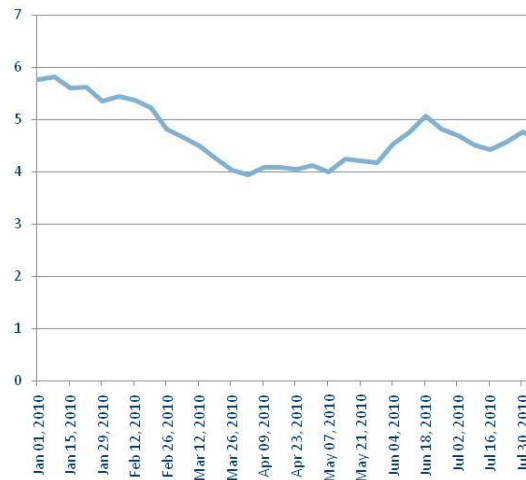
Stable Supplies = Stable Prices

- U.S. natural gas reserves have increased by more than 70%
- Price volatility has declined sharply, even though still at an early stage of developing new sources of supply, due to:
 - Prolific on-shore production of gas from shale
 - Vastly expanded pipeline distribution system

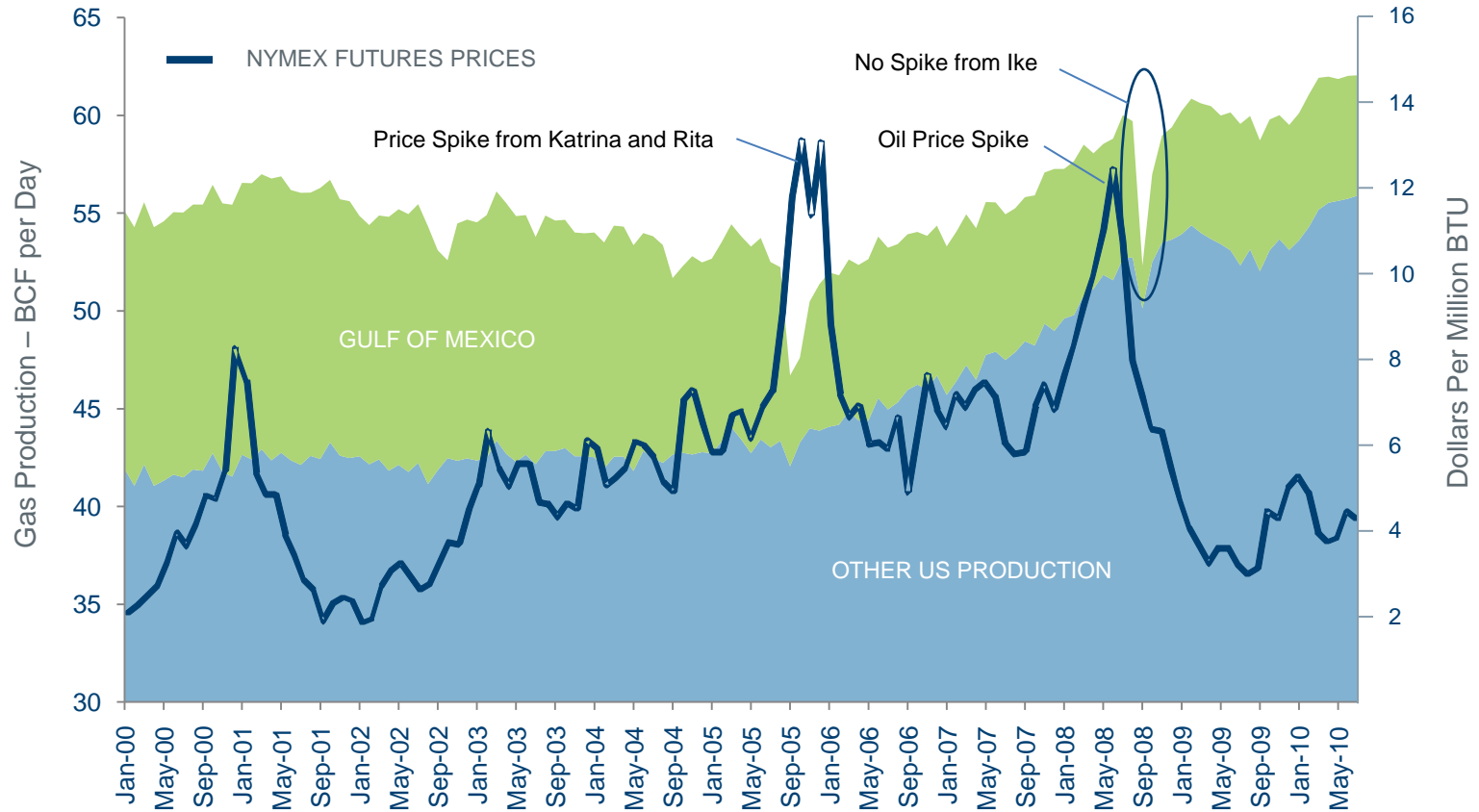
U.S. NG Production at 100 Years



Natural Gas Futures (NYMEX)
(Dollars/Mil. BTUs)



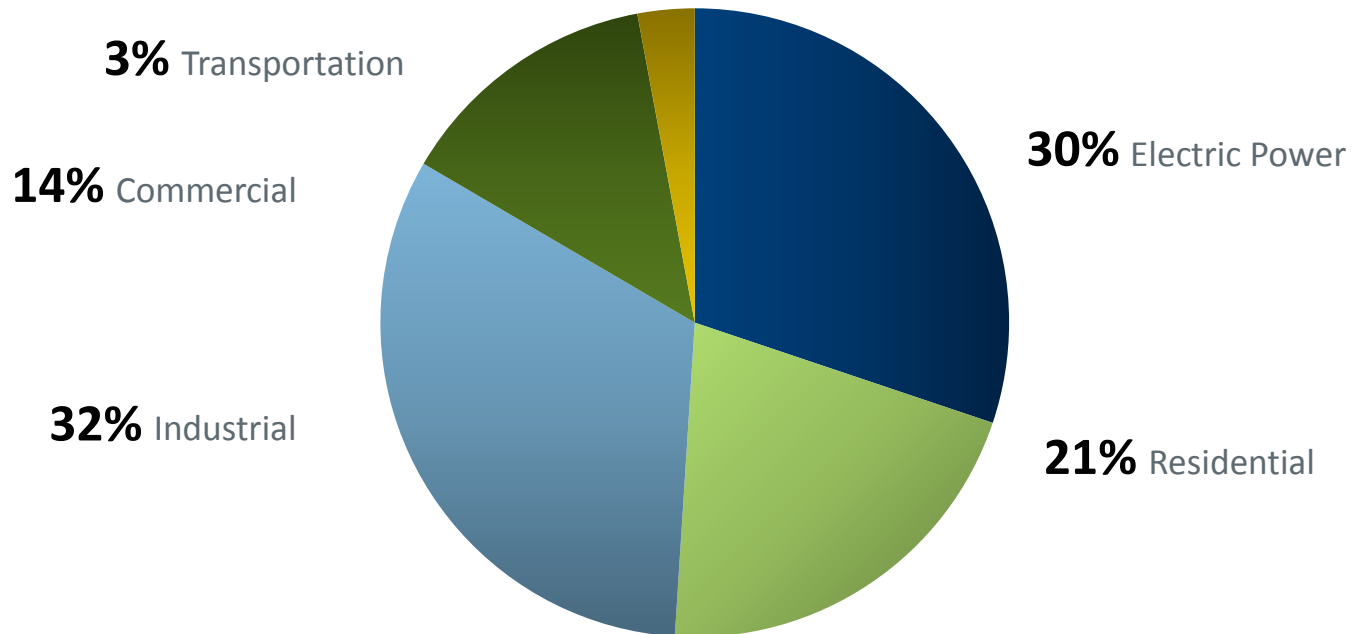
Reducing Volatility Through Greater Supply



Source: EIA, Bloomberg

How We Use Natural Gas

How Natural Gas is Used Today



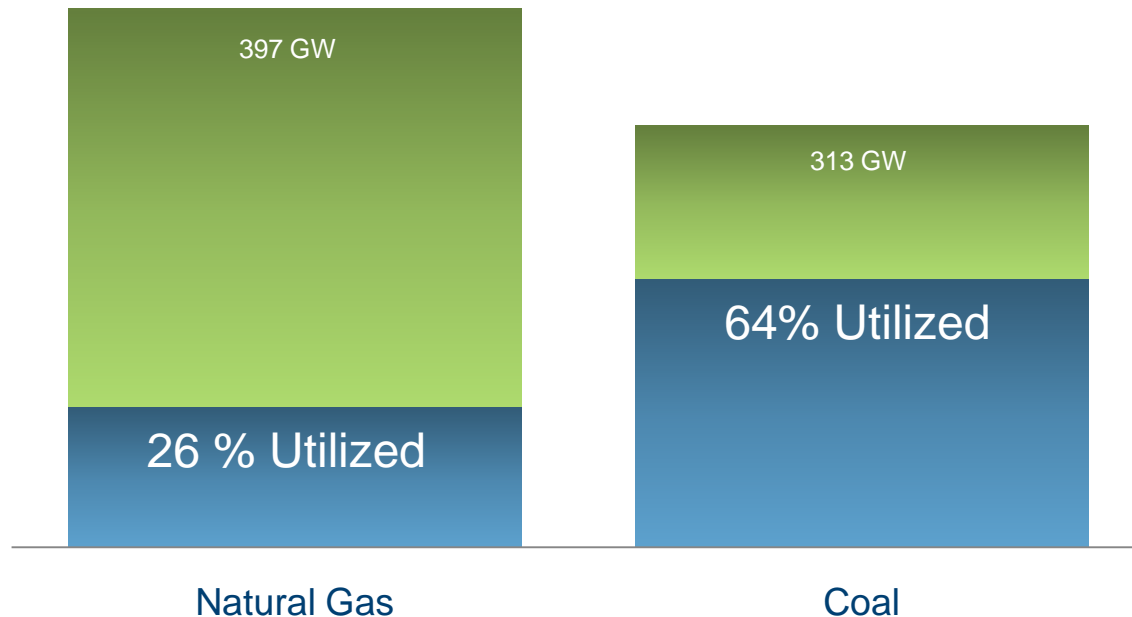
Source: EIA, *Natural Gas Year In Review*, 2009

An aerial night photograph of the New York City skyline, showing numerous illuminated skyscrapers and buildings. The Empire State Building is prominent on the right, lit with red lights at the top. The text "POWER GENERATION" is overlaid in large, white, bold, sans-serif capital letters across the center of the image.

POWER GENERATION

Ready Now

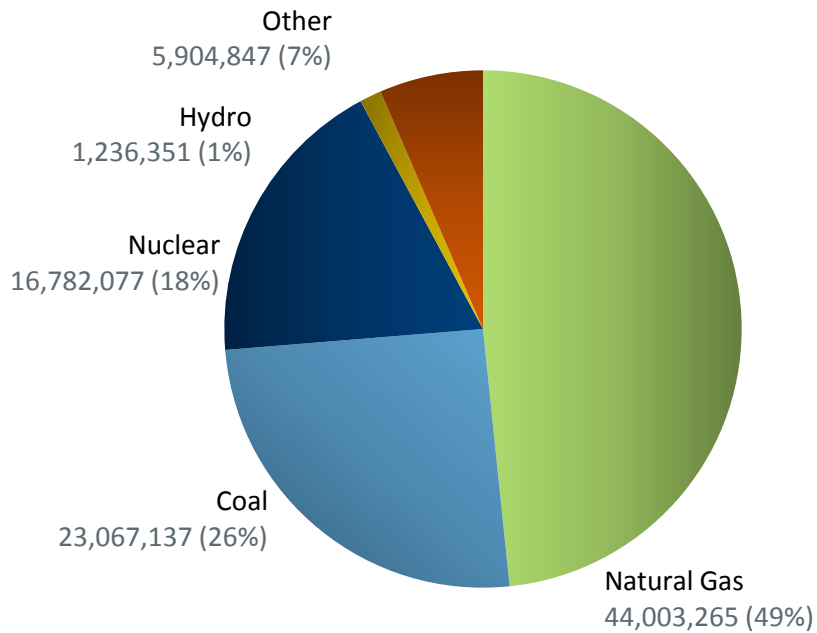
Utilization of Electric Generation Capability (net generation as a percentage of net summer capacity)



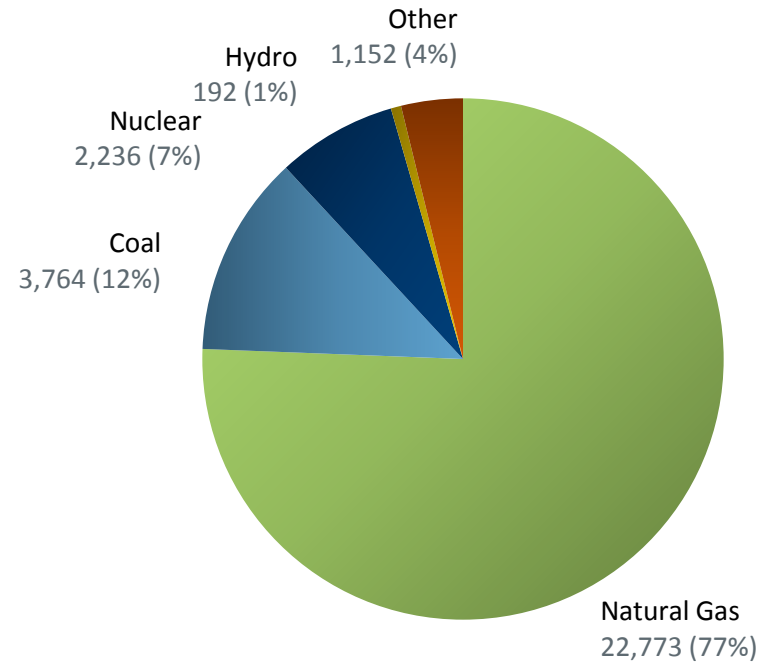
Source: EIA, 2009 Electric Power Annual

Louisiana's Electricity Mix

Net Generation
(MWh)



Existing Capacity
(MW)



Source: EIA-906, EIA-920, EIA-923, EIA-860

Cleaner for Power Generation

Natural Gas = Fewer Emissions

(tons per thousand MWH/year)

	Coal	Natural Gas
CO ₂	891	338
CO ₂ w/Capture	93.8	33.8
Carbon Monoxide	0.55	0.15
NO _x	0.3	< 0.0
SO ₂	0.5	< 0.0
Particulates	0.1	none
Mercury	< 0.0	none
VOCs	< 0.0	none

Source: R.W. Beck, Comparison of Fuels Used for Electric Generation
in the U.S, February 2009 (Prepared for NGSA)

2016 Expected Costs

Levelized Cost of New Generating Technologies - 2016

Plant Type	Capacity Factor (%)	Total System Levelized Cost (¢ per KWH)
Natural Gas – Combined Cycle	87	6.31
Natural Gas – Conventional	87	6.61
Natural Gas – Combined Cycle with CCS	87	8.93
Coal – Conventional	85	9.48
Coal – Advanced	85	10.94
Coal – Advanced with CCS	85	13.62
Wind – Onshore	34	9.70
Wind – Offshore	34	24.32
Solar – PV	25	21.07
Solar – Thermal	18	31.18
Biomass	83	11.25
Nuclear	90	11.39

Source: Institute for Energy Research, using data from EIA Annual Energy Outlook 2011.

TRANSPORTATION

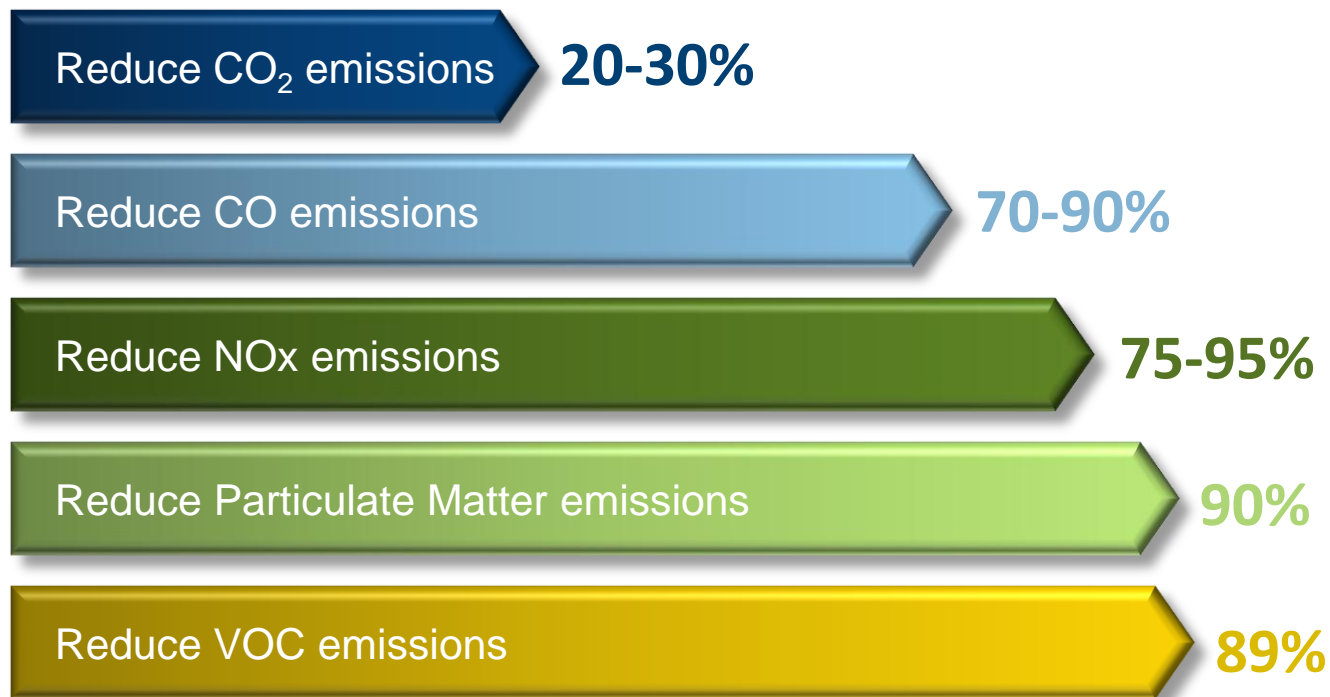


Our Dependence on Foreign Oil

- How much do we use?
 - 4,250,000,000 barrels imported in 2010
- How much does it cost?
 - \$337,000,000 on imported oil in 2010
 - \$1,091 for each person in America
 - In 2009, energy imports made up nearly 60% of our trade deficit
- Where does the money go?
 - Among the top countries we import from: Venezuela, Saudi Arabia, Nigeria, Russia, Algeria, Angola and Iraq.

Cleaner for Vehicles

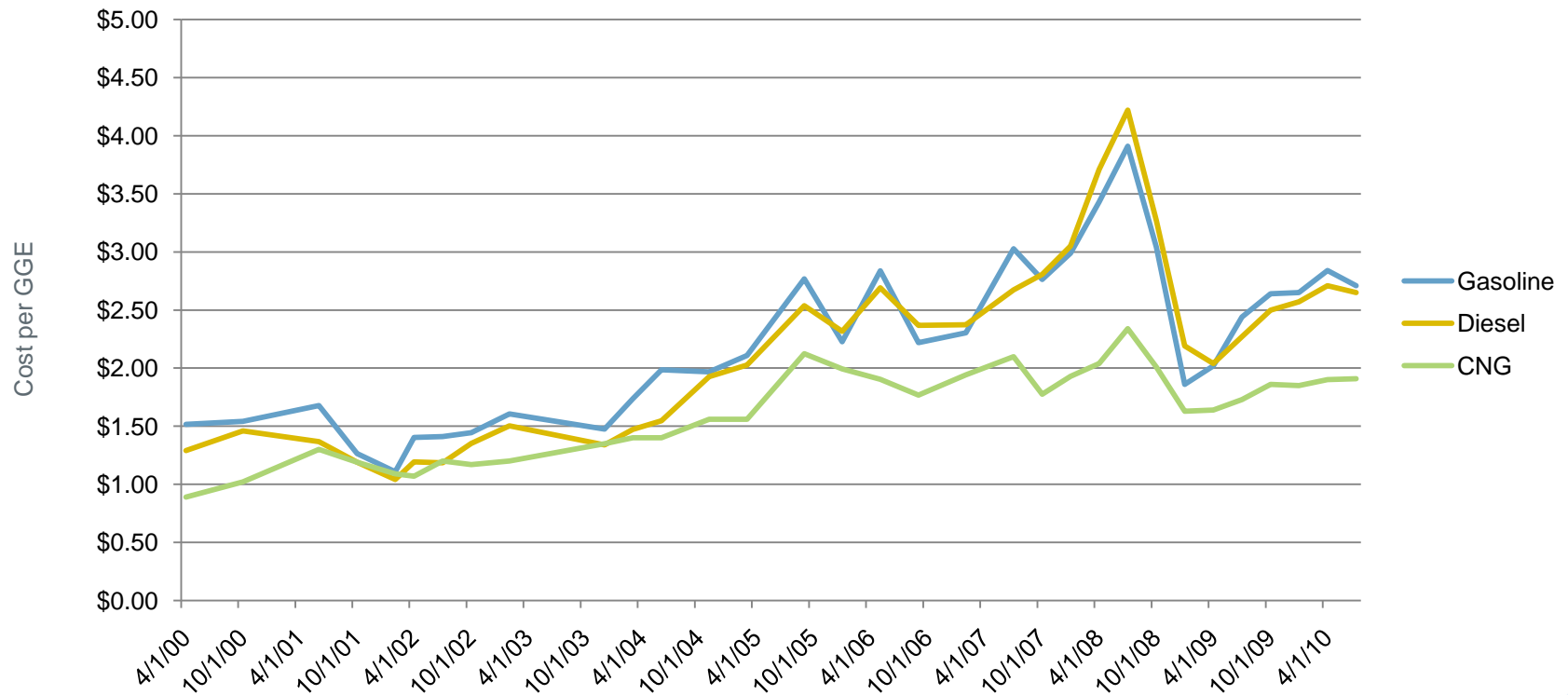
- Compared to gasoline or diesel, NGVs:



Savings On the Road and at the Pump

Average U.S. Retail Fuel Prices

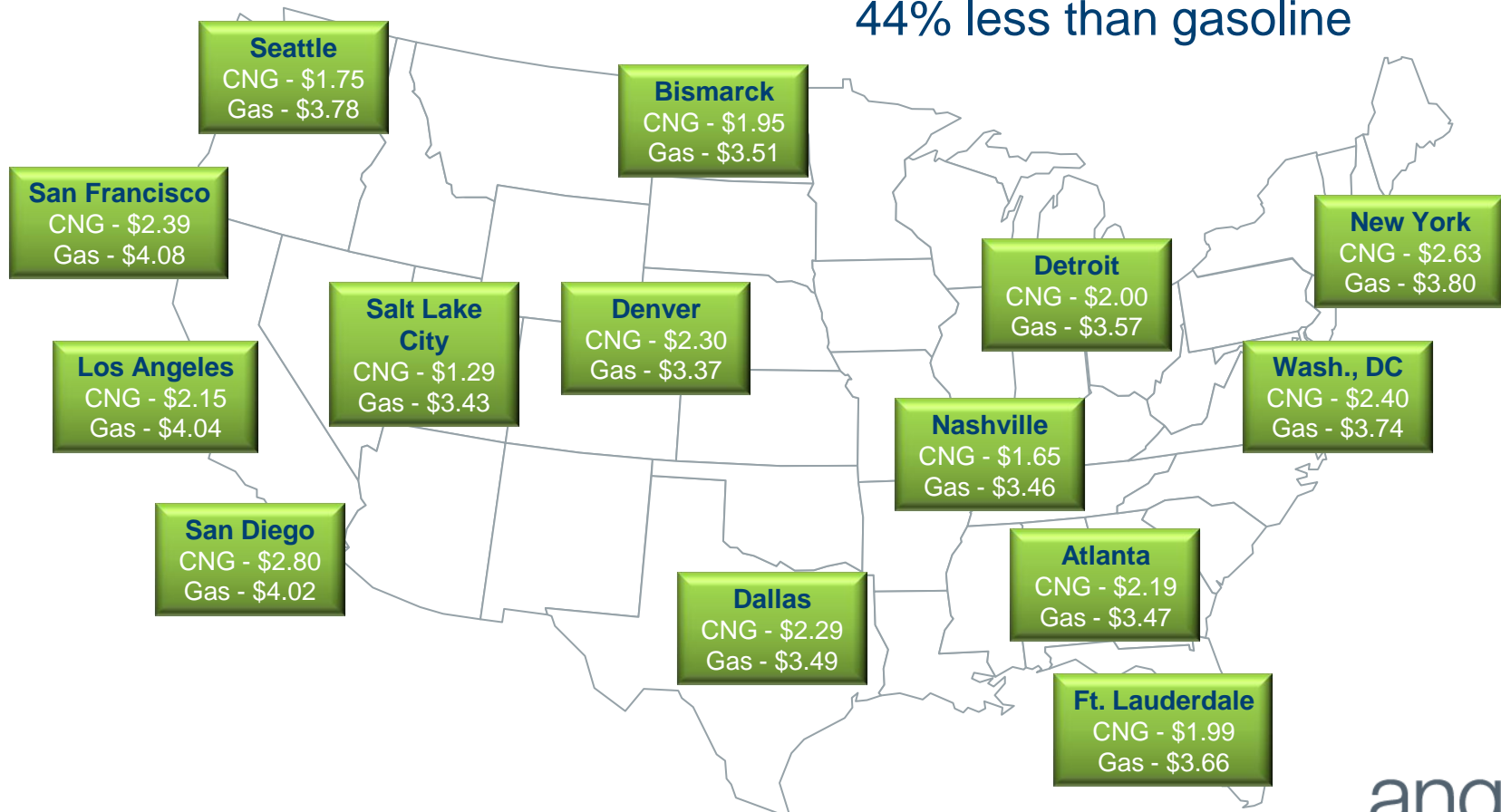
Per Gasoline Gallon Equivalent (GGE)



Source: DOE, Alternative Fuels and Advanced Vehicles Data Center

Nat Gas vs. Conventional Gasoline

On average, CNG costs
44% less than gasoline



Source: CNG prices captured in March 2011 by CNGPrices.com
Gas prices reflect city average on March 28 from GasBuddy.com

Benefits: What We Can Do

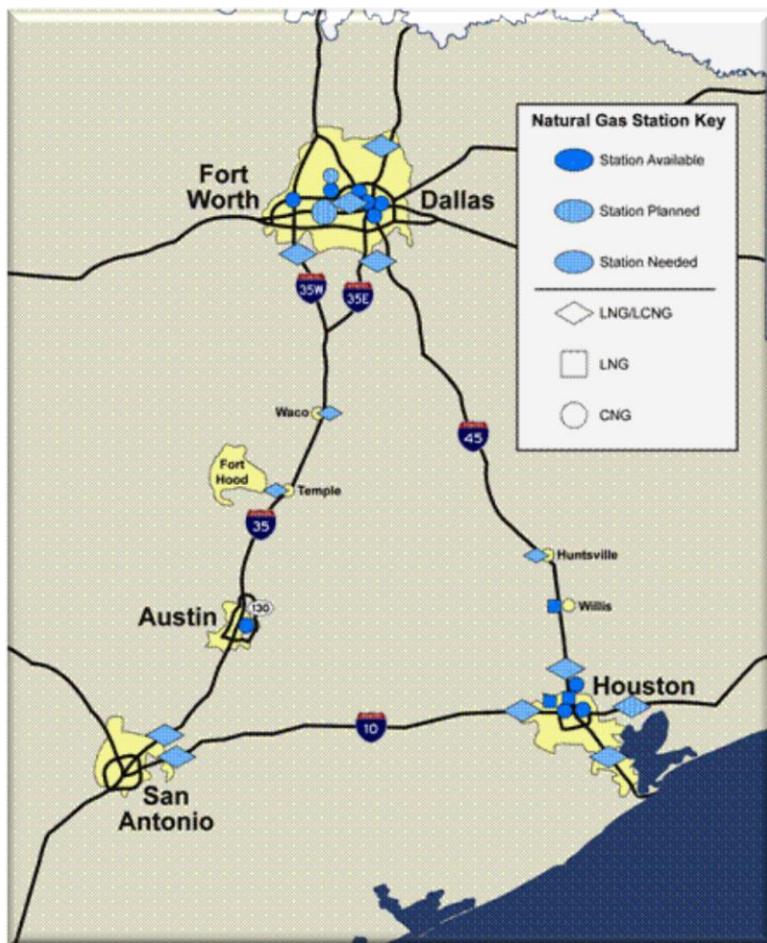


Converting just one heavy-duty waste truck from diesel to natural gas offers the emissions reduction equivalent of taking 325 cars off the road.



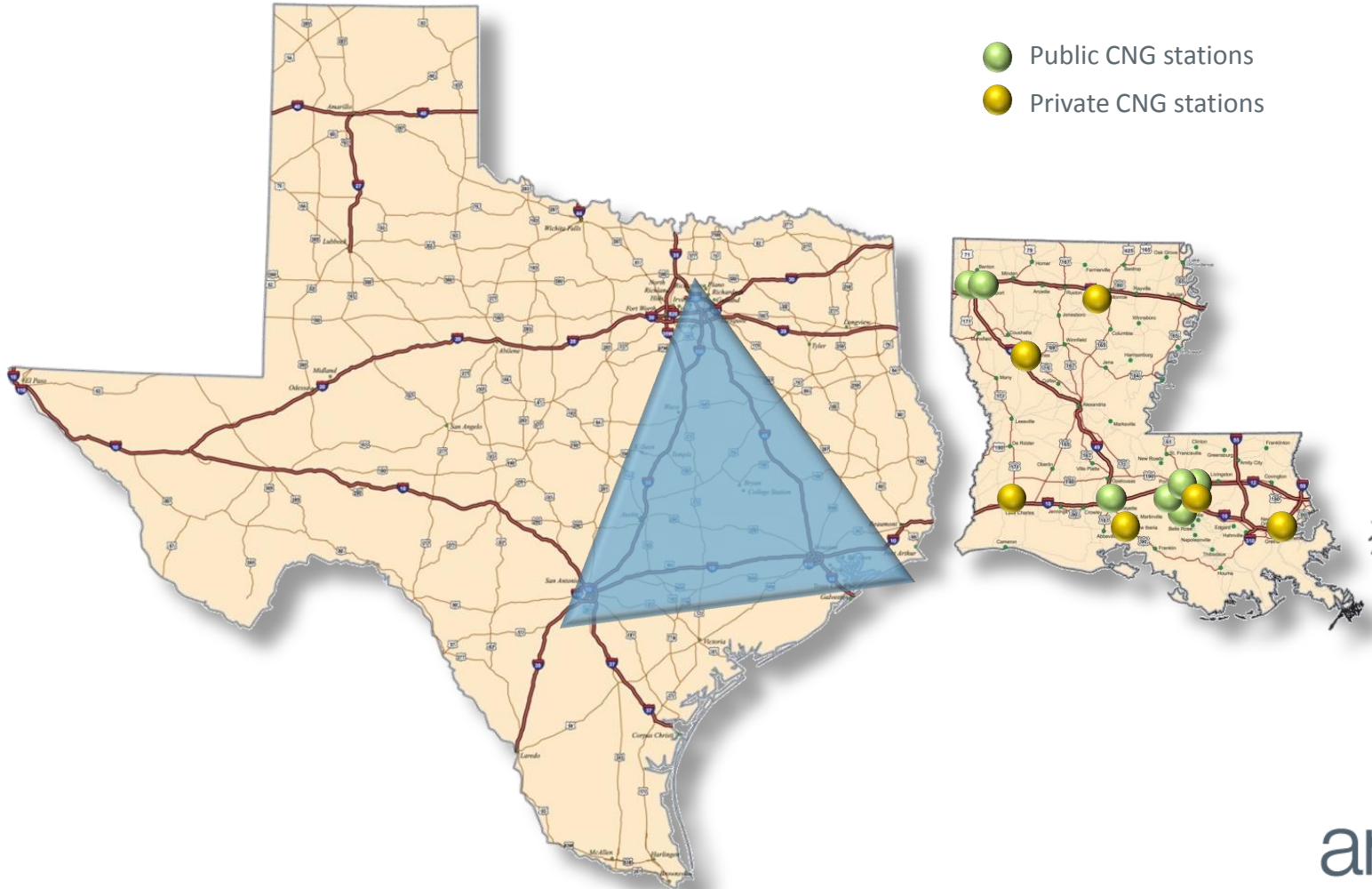
Replacing 3.5 million medium- and heavy-duty trucks and buses with CNG-powered counterparts by 2035 would save at least 1.2 million barrels of oil per day.

Texas Clean Transportation Triangle



- Establish fueling infrastructure at regular intervals on interstate exists along I-35, I-10, and I-45 to service long-haul transportation vehicles
- Anchor stations proximal to urban settings to act as hubs for more localized traffic
- 15 stations offering public LNG and CNG located at current retail facilities along the interstates
- Cooperative effort between natural gas producers, fleet customers and retail partners

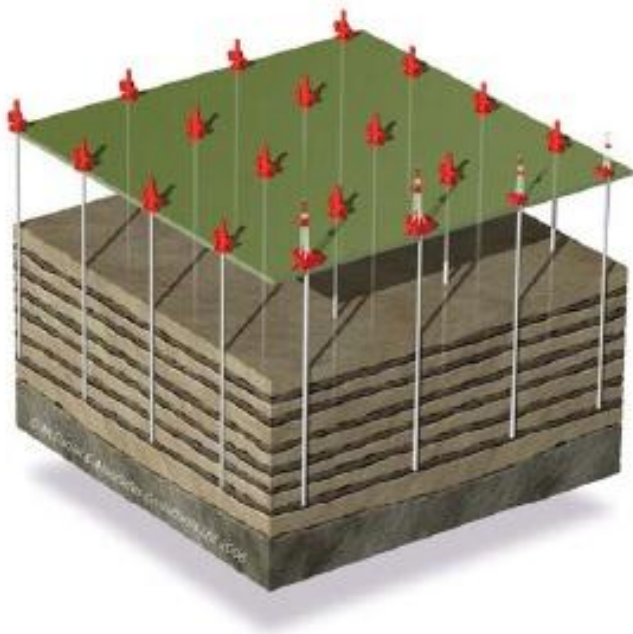
Corridor Opportunities



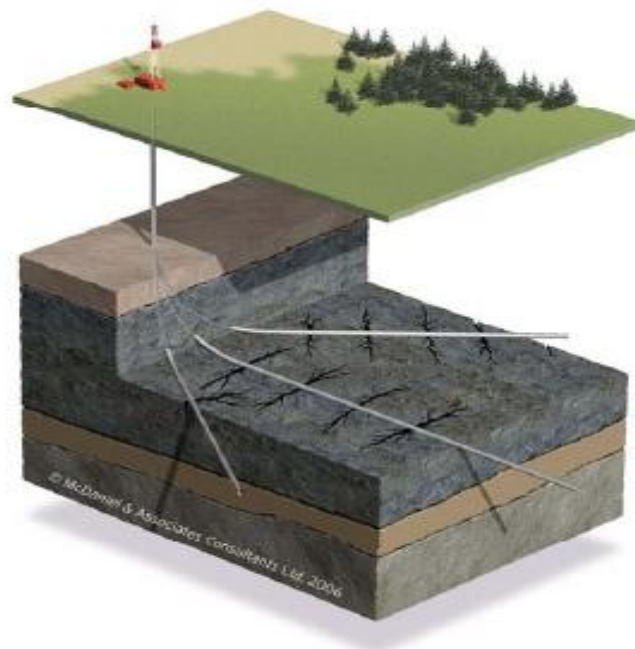
An aerial photograph of an oil production facility. A tall, white lattice-structured derrick with a red top section stands prominently in the center. It is situated on a blue-painted concrete pad. To the left of the derrick is a blue modular building with a grey roof. In the foreground, there are more blue structures and yellow stairs. The facility is surrounded by a dense forest of green trees. In the background, a steep, rocky mountain slope rises above the treeline. The word "PRODUCTION" is overlaid in large, white, bold, sans-serif capital letters across the middle of the image.

PRODUCTION

Horizontal Drilling



Traditional Wells

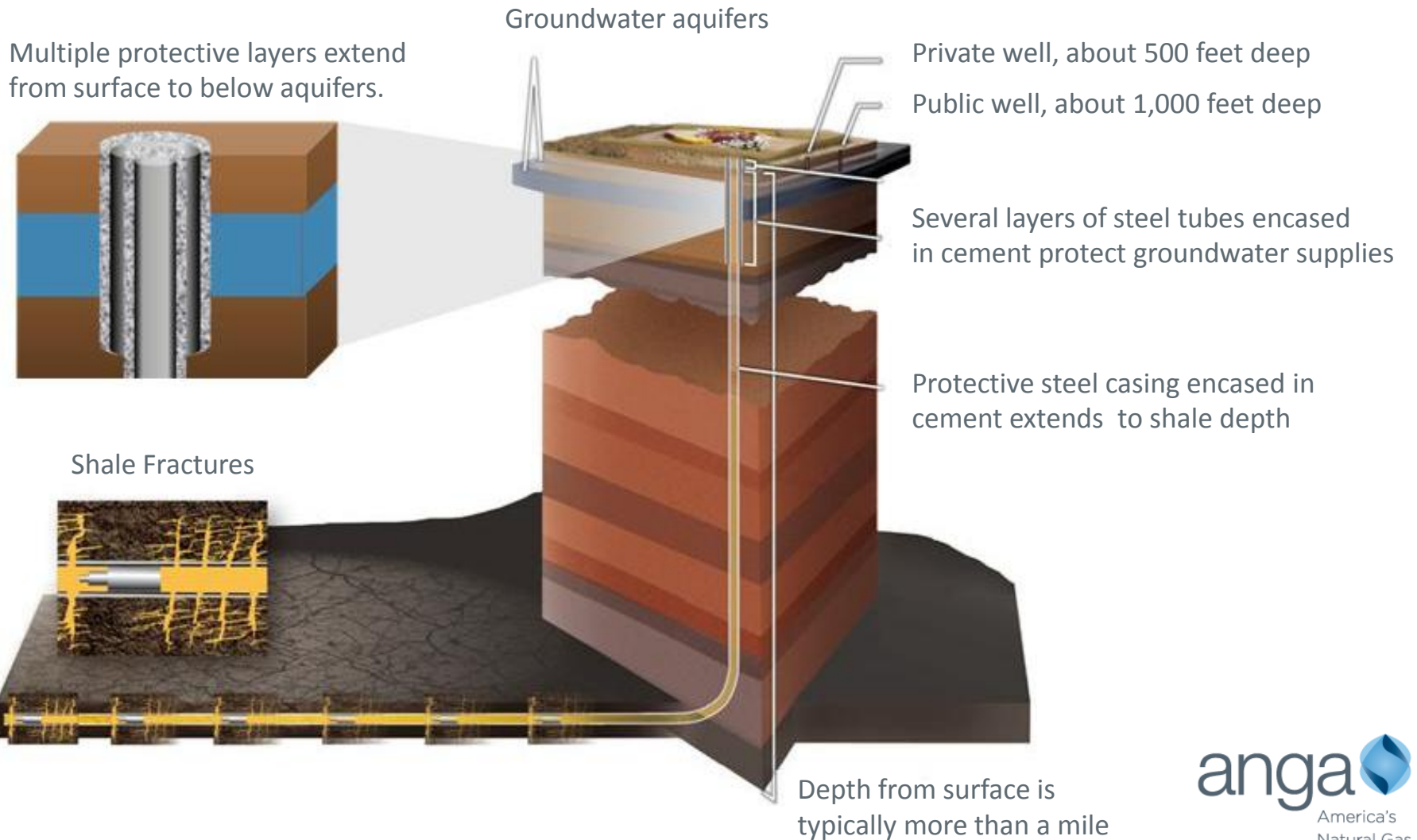


Horizontal Drilling

The Power of Progress

- **Smaller surface impact.**
 - The average well-site today is just 30% of the size of its 1970s counterpart—and today's wells can access over 60 times more below-ground area.
- **Fewer wells, more clean energy.**
 - Half as many wells are needed to produce the same amount of clean energy as 20 years ago.
- **Less waste.**
 - We can retrieve the same amount of gas while producing 30% less waste than a decade ago.
- **Fewer air emissions.**
 - More efficient operations also means less energy consumption, and thus less air emissions, per unit of natural gas produced.

Fracture Stimulation and Gas Production are Completely Isolated from Fresh Water



A Regulated Process

- **The Clean Water Act** regulates surface water discharges and storm-water runoff.
- **The Clean Air Act** sets rules for air emissions from engines, gas processing equipment and other sources associated with drilling and production activities.
- **The Safe Drinking Water Act** regulates the disposal of fluid waste deep underground (far below fresh water supplies and separated by approximately one mile of impermeable rock).
- **The National Environmental Policy Act** requires permits and environmental impact assessments for drilling on federal lands.
- **The Occupational Safety and Health Act** sets standards to help keep workers safe. These include requiring Material Safety Data Sheets be maintained and readily available onsite for any chemicals used by workers at that location.
- **The Emergency Planning & Community Right-to-Know Act** requires storage of regulated chemicals in certain quantities to be reported annually to local and state emergency responders.

The Industry and State Regulators Lead the Way

- Interstate Oil and Gas Compact Commission
- Groundwater Protection Council
- AOGC Rule B-19
- Pennsylvania DEP Rule 78
- Wyoming Rule – Chapter 3
- Model Regulatory Framework



STATE OF ARKANSAS
OIL AND GAS COMMISSION



A man with short, light brown hair and a slight smile is wearing a dark blue work jacket. He is holding a yellow hard hat in his left hand. The background is an industrial setting with a tall, rusted metal structure on the left and a hazy, overcast sky. The text "Providing Economic Stability" is overlaid in large, white, sans-serif font across the center of the image.

**Providing
Economic Stability**

Working for Louisiana



- More than 266,000 total jobs
 - 62,581 direct
 - 77,406 indirect
 - 126,603 induced
- About 13.7% of total employment
- \$12.6 billion in labor income
- \$24.4 billion in value-added economic output

Louisiana Impacts

- Economist Loren C. Scott released two studies on the economic impacts of the Haynesville Shale, finding \$11.5 billion dollars spent by exploration companies in the state during 2008-09
 - Including:
 - \$5 billion+ in Direct Drilling Expenditures
 - \$642.3 million for the state treasury
 - \$84 million in wages
- In 2009, the state experienced a loss of 38,500 jobs, or 2% of the total workforce
 - The study found that without natural gas employment, the job loss would have been 3% worse, equal to 96,000 lost jobs

A sunset scene with a drilling rig and a field of blue flowers. The sky is a mix of orange, yellow, and pink. The rig is a tall, dark structure on the right. The foreground is a field of blue flowers, and the background has dark silhouettes of trees.

QUESTIONS ?



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